GENUS

October 14, 1988

Mr. Greg Eckert
South Bay Section T-4-5
Toxics and Waste Management Division
U.S. Environment Protection Agency
215 Fremont Street
San Francisco, California 94118

RE: Request for Information Pursuant to Section 104 of CERCLA and Section 3007 of RCRA for Ellis Street Facilities and Surrounding Environs.

Dear Mr. Eckert:

Enclosed are the answers to the questionnaire you sent to GENUS.

If you have any questions, please do not hesitate to call me.

Sincerely,

GENUS INCORPORATED

Norman Zetterquist by [illegible]

Norman E. Zetterquist
Director, Process Development

ms

THIN FILM DIVISION
Genus Incorporated
515 Ellis Street
Mountain View, CA 94043
TEL 415-960-1120
FAX 415-961-0614 TLX 17-1498

GENUS' RESPONSE TO EPA'S REQUEST FOR INFORMATION

Question 1:

Identify the time periods in which you have occupied the site, your association with the site (i.e. owner, tenant) during each time period, and the types(s) of business conducted at the site during each time period.

Answer 1:

Genus moved to this site in July 1982 as a tenant. Genus develops and manufactures chemical vapor deposition equipment.

Question 2:

Identify your RCRA EPA I.D. Number(s) (if applicable) for each time period of your occupation of the site.

Answer 2:

As of April, 1987, our current ID Number is CAD 981581978. Our previous ID Number was CAX 000070052.

Question 3:

If you leased the site, identify the owner during each time period of your occupancy.

Answer 3:

Since our occupancy of the site, we have leased the property from Bank Amerilease Group, 555 California Street, San Francisco, CA 94104.

Question 4:

To the extent you have the information, identify the prior and subsequent occupants of the site, their time period of occupation, their association with the site (i.e. owner, tenant), and the type of business conducted by them at the site.

Answer 4:

We do not have complete information about the previous tenants of this site before our occupancy in 1982. We believe, however, that Hewlett Packard was the only previous tenant. Hewlett Packard did not conduct manufacturing at the site and used it only for storage of computer components.

Question 5:

Identify each address in Mountain View, California, other than the site, in which you had or have a facility.

Answer 5:

We have another facility in the area located at 290 Ferguson Avenue, Mountain View, CA 94043.

Question 6:

Did you ever transport to the site or use, generate, store, treat, dispose, or otherwise handle at the site any hazardous material (see Definitions on page 2 of this attachment). If the answer to the preceding question is anything but an unqualified "no," identify:

a. The name, chemical composition, characteristics, physical state, (e.g. solid, liquid) of each hazardous material so transported, used, generated, stored, treated, disposed, or otherwise handled.

b. The persons who supplied you with each such hazardous material.

c. How each such hazardous material was used, generated, stored, treated, transported, disposed or otherwise handled by you.

d. When each such hazardous material was used, generated, stored, treated, transported, disposed or otherwise handled by you.

e. Where each such hazardous material was used, generated, stored, treated, transported, disposed or otherwise handled by you.

f. The quantity of each such hazardous material used, generated, stored, treated, transported, disposed or otherwise handled by you.

Answer 6:

We have prepared a chart (Attachment A) that provides the information currently available requested in parts a. through f. of this question. We will supplement this chart with additional information as it becomes available.

Our list of chemicals is comprehensive and includes certain chemicals and gases that may not be considered "hazardous materials" as defined in the EPA Questionnaire. In addition, please see Attachment B for more detailed information in response to part b. We have also prepared a map, and a narrative to accompany the map, (Attachment C), which provides detailed information on part e. Finally, we have attached a general description of how hazardous materials are used and handled at Genus (Attachment D).

Question 7:

List and identify each of the following items located on the site during your period(s) of occupation:

-- Above-ground and below-ground tanks, containers, sumps, piping or systems used for the treatment, storage, disposal or transfer of hazardous materials.

-- groundwater monitoring wells, groundwater supply wells, vadose zone wells and underground injection wells.

-- storm water drainage system, sanitary sewer system, including septic tank(s) and subsurface disposal system(s).

Include in the identification of each item:

a. The location of the item (describe the location and provide a map or diagram).

b. A detailed physical description of the item (including among other things and where applicable, whether or not it has secondary containment, is vaulted, or operates by gravity or pressure).

c. Whether or not the item is still on the site, and if not, the time period the item was on the site, when it was removed, and by whom.

d. The materials contained within the item.

Answer 7:

Above-ground tanks

There are four above-ground tanks associated with the acid neutralization system, and one liquid nitrogen storage tank. Please see Attachments C and E. To our knowledge there have not been any other above ground tanks on the site.

Below-ground tanks

There are currently no below ground tanks on the site, and to our knowledge there have never been any below ground tanks on the site.

Containers

We have two 55 gallon drums on the site, immediately adjacent to the building, in a secondarily contained storage area designed in accordance with the City of Mountain View specifications. The drums are located on a concrete berm within a fenced area that is completely surrounded by concrete or asphalt for at least 50 yards in every direction, except where the concrete meets the foundation of the building on one side. We also store materials in the various bottles and cylinder containers we receive from our

suppliers. Please refer to Attachment C for answers to parts a. through d. Attachment C includes a map and a detailed description of the containers on the site.

Sumps

There are currently no sumps on the site, and to our knowledge there have never been any sumps on the site.

Piping or Other Systems

We have an acid neutralization system used to treat acid wastes and a network of gas lines originating at the liquid nitrogen tank. Both systems are above ground systems. We also have interior gas piping systems from gas cylinders to their point of use. Please refer to Attachments C and E for answers to parts a. through d.

Wells

We have not installed any groundwater monitoring wells, groundwater supply wells, vadose zone wells, or underground injection wells on the site. We do not believe that there have been any such wells on the site during our occupancy of the site. We think that there is one or more monitoring wells located on adjacent property to the south of our site.

Storm Water Drainage System

A storm drain system is located on the site. Please see Attachment F for responses to parts a., b., and d. of this question. In response to part c., the storm drain system is still located on the site.

Sanitary Sewer System

A sanitary sewer system in located on the site. Please see Attachments F and G for responses to parts a., b., and d. of this question. In response to part c., the sanitary sewer system is still located on the site.

Septic Tanks and Subsurface Disposal Systems

There are currently no septic tanks or other subsurface disposal systems on the site and, to our knowledge, there have never been any septic tanks or a subsurface disposal system or the site.

Question 8:

Identify all leaks, spills or releases or threats of releases of any kind into the environment of any hazardous materials that have occurred or may occur at or from the site. Include in this identification:

a. When such releases occurred or may occur.

b. How such releases occurred or may occur.

c. What hazardous materials were released or may be released.

d. What amount of each such hazardous material was so released.

e. Where such releases occurred or may occur.

f. Any and all activities undertaken in response to each such release or threatened release.

g. Any and all investigations of the circumstances, nature, extent or location of each such release or threatened release including the results of any soil, waste (ground and surface) or air testing that was undertaken.

h. All persons with information relating to subparts a. through g. of this Question.

Answer 8:

We have had some releases inside the facility of water that contained trace amounts of acid. These releases were caused by sink overflows and, on one occasion, by a release of the sprinkler system inside the scrubber ducts. We are not providing details of these incidents because we do not believe that the substances released were hazardous, i.e., the releases consisted of water that contained only trace amounts of acids. In such cases, however, we believe that the water was vacuumed from the facility floor. Any water that was not vacuumed up would have passed through the drains, to either the acid neutralization system or to the sanitary sewer system.

A former employee reported that about three years ago a truck making a delivery on-site released a small quantity of diesel fuel (i.e., less than one gallon) on the concrete parking lot. We have no reason to believe that the fuel penetrated the asphalt paving in the area.

One employee reported that on one occasion, about three years ago, a maintenance man (who has since left the company) informed him that some solvents had been released from the primary waste container (a drum) into the secondary containment area (a concrete holding pool located underneath the drum). We are unaware of the quantity of solvents that may have been released; however, the release was not sufficient to cause an overflow from the secondary containment area onto the surrounding area. The maintenance man informed the employee that he had cleaned out the area and had replaced the drum.

Question 9:

Provide all existing technical or analytical information about the site, including but not limited to all analyses from the sampling of any monitoring or supply wells, and all data and documents related to soil, water (ground and surface), geology, geohydrology, or air quality on or about the site.

Answer 9:

We have attached copies of the only technical or analytic analyses of the site of which we are aware. See Attachment H for copies of two analyses of the site. We also believe that neighbors have had samplings of soil taken from their monitoring wells; however, we do not have copies of the results of those samplings.

Question 10:

Are you or your consultants planning to perform any investigations of the soil, water (ground or surface), geology, hydrogeology or air quality on or about the site? If so, identify:

a. What the nature and scope of these investigations will be.

b. The contractors or other persons that will undertake these investigations.

c. The purpose of the investigations.

d. The dates when such investigations will take place and be completed.

e. Where on the site such investigations will take place.

Answer 10:

We have not made plans to perform any investigations of the site.

Question 11:

Provide a descriptive list of all insurance policies held by Subrato Development Company during your period(s) of occupation of the site. The description should include:

a. The effective dates of the policy.

b. The policy number.

c. The general type of policy (e.g., comprehensive, general liability).

d. The name and address of the insurance company issuing the policy.

e. The amount of coverage under the policy.

f. Any specific provisions of the policy regarding claims for environmental damages, including, but not limited to, whether or not the policy covers sudden, nonsudden

or both types of accidents, and whether or not the policy contains a "pollution exclusion" clause.

Additionally, please provide a copy of all of these insurance policies, including any amendments, endorsements, riders, or other such attachments to the main policy document.

Answer 11:

Please see Attachment I for insurance information.

Question 12:

Provide all information and copies of all documents not already provided pursuant to the questions above which concern, refer, or relate to hazardous materials transported to, used, generated, stored, treated, disposed, or otherwise handled at the site.

Answer 12:

Please see Appendix. We did not produce some documents that could be construed to relate to hazardous materials because we believe that these documents related only tangentially to hazardous materials and to the thrust of your inquiry. These documents include materials used to prepare safety training classes, documents relating to the construction of the

neutralization system, correspondence that we received from state and local agencies about the procedures for obtaining permits, and other miscellaneous matters of a similar nature. These documents will be made available upon request.

Question 13:

Identify the person(s) answering these questions on behalf of Respondent.

Answer 13:

Norman Zetterquist is primarily responsible for this questionnaire. Please see Attachment J for a list of other persons who assisted in preparing responses.

Question 14:

For each and every Question contained herein, identify all persons consulted in the preparation of the answer.

Answer 14:

Please see Attachment J for a list of all persons consulted in the preparation of each answer.

Question 15:

If you have reason to believe that there may be persons able to provide a more detailed or complete response to any Question

contained herein or who may be able to provide additional responsive documents, identify such persons and the additional information or documents that they may have.

Answer 15:

In gathering information for this questionnaire, we contacted those persons, including several former employees, whom we believed could best respond to the questions contained in this information request.

Question 16:

Identify all persons, including Respondent's employees, who have knowledge or information about the generation, use, treatment, storage disposal or other handling of hazardous materials at, or transportation of hazardous materials to, the site.

Answer 16:

To some extent every employee who has ever worked at Genus, and every driver of any waste disposal service or supplier of hazardous materials that we have ever used, could have knowledge and information about these matters. We believe, however, that we have listed, in Attachment J, those persons whom we could reasonably expect to have knowledge or information about these matters.

LIST OF CODES USED IN HAZARDEOUS MATERIAL SUMMARY CHART

	CODE	DESCRIPTION
CHARACTERISTIC CODES		
	C1	CORROSIVE
	C2	FLAMMABLE
	C3	OXIDIZER
	C4	ACID
	C5	AKLALINE
	C6	TOXIC
	C7	POISONOUS
	C8	INERT
STATE CODES		
	S	SOLID
	L	LIQUID
	G	GAS
SE CODES		
	U1	CVD RESEARCH-CHEMICAL REACTIONS WITHIN CVD EQUIPMENT
	U2	CLEAN SILICON WAFERS IN PREPARATION FOR FILM DEPOSITION WITH CVD EQUIP.
	U3	CLEAN PARTS
	U4	PH ADJUSTMENT OF ACID WATER BEING PROCESSED BY NEUTRALIZATION SYSTEM
	U5	PHOTOMASKING
HERE USED/STORED CODES		
	A	EXTERIOR CHEMICAL/GAS STORAGE AREA AT REAR OF BLDG
	B	MAIN R&D LABORATORY
	C	EQUIPMENT CHASE SUPPORTING THE "B" & "D" LABS
	D	SMALL R&D LABORATORY-ALSO CALLED "YELLOW ROOM"
	E	APPLICATIONS LABORATORY-BOTH CLEAN ROOM & GRAY RM
	F	EQUIPMENT CHASE SUPPORTING THE APPS LAB
	G	RECEIVING AREA
	H	LIQUID NITROGEN STORAGE AREA
	I	D.I. WATER SYSTEM
	J	DOCUMENT CONTROL
	K	JANITORIAL SUPPLY ROOM
	L	FACILITIES OFFICE
	M	MODEL SHOP
	N	ELECTRONICS LABORATORY
DISPOSAL CODES		
	D1	ACID NEUTRALIZATION SYSTEM RELEASE TO CITY SEWER
	D2	FUME SCRUBBER WITH RELEASE TO ATMOSHERE & WATER TO NEUTRAL.SYSTEM.
	D3	EVAPORATION TO ATMOSPHERE
	D4	LIQUID SOLVENTS & SOLID HAZARDEOUS WASTES TEMPORARILY STORED IN
		APPROVED 55 GALLON DRUMS IN DOUBLE CONTAINED AREA UNTIL DISPOSED OF BY
		APPROVED HAULER

GENUS CORP, ELLIS STREET FACILITY-CHEMICAL,GAS HAZARDOUS MATERIAL SUMMARY

CHEMICAL NAME/ COMMON NAME	CHAR. CODE	STATE CODE	SUPPLIER(S) CODE	USE CODE	DISPO CODE	WHERE	EST. MAX ONSITE QTY	CHEMICAL NAME/ COMMON NAME	ANNUAL PURCHAS QUANTITY 1982	1983	1984	1985	1986	1987	YTD-1988	MEASURE	
							0										
ACETIC ACID	C1,C2,C6	L	S2,S26	U2	D1		1 CASE	ACETIC ACID	0	0	30	0	0	0	0	LBS	
ACETONE	C2	L	S1,S2,S3,S24	U3	D2,D3,D4	A,B	1 CASE	ACETONE	12	16	16	0	0	8	4	GALLONS	
ACETYLENE	C2	G	S20,S21	U1	D2,D3	M	1 CYLINDER	ACETYLENE	0	0	380	0	0	0	760	CU FT	
ALCONOX DETERGENT			S7	U3	D1		4 LB	ALCONOX DETERGENT	0	0	4	0	0	0	0	LBS	
ALUMINUM CHLORIDE			S5				500 GM	ALUMINUM CHLORIDE	0	0	500	0	0	0	0	GRAMS	
AMMONIA	C4	L	S9	U2	D1,D2	A,C	1 CASE	AMMONIA	0	13	0	0	0	0	0	GALLONS	
AMMONIA (LOW PRESSURE)			S21	U1			1 CASE	AMMONIA (LOW PRESSURE)	0	31	0	0	40	0	0	LBS	
AMMONIA HYDROXIDE	C3	L	S1,S2	U2,U4	D1,D2	A,B	100 LB	AMMONIA HYDROXIDE	0	1	56	0	0	28	960	LBS	
AMMONIA PHOSPHATE		S	S7				500 GM	AMMONIA PHOSPHATE	0	0	500	0	0	0	0	GRAMS	
AMMONIUM FLUORIDE	C4	L	S1,S2,S3,S24	U2,U4	D1,D2	A,B,E	50 LBS	AMMONIUM FLUORIDE	72	4	32	64	0	256	356	LBS	
ARGON	C8	G	S20,S21	U1	D2,D3	A-F	10 CYLINDER	ARGON	1008	2010	2010	3360	6048	8400	12432	CU FT	
ARSINE/HELIUM MIXTURE	C6	G	S21		D2		1 CYLINDER	ARSINE/HELIUM MIXTURE	78	0	0	0	0	0	0	CU FT	
BENZENE RE	C2	L	S2,S8	U3	D3,D4		1 PINT	BENZENE RE	0	1	0	0	0	0	0	PINT	
BORON TRICHLORIDE	C6		S20	U1	D2		15 LB	BORON TRICHLORIDE	0	0	14	0	0	0	0	LBS	
BUFFERED OXIDE ETCH			S2,S3	U2			1 CASE	BUFFERED OXIDE ETCH	36	93	72	0	0	0	0	LBS	
CHLORAMINE T		S	S6,S7				5 KGM	CHLORAMINE T	0	2.5	5	0	0	0	0	KILOGRAMS	
CHLORINE	C1,C6		S21	U1	D2		2 CASE	CHLORINE	0	6	150	0	0	0	0	LBS	
DECANE			S7		D4		500 GM	DECANE	0	500	0	0	0	0	0	GRAMS	
DIBORANE	C2,C6	G	S20	U1	D2		1 CYLINDER	DIBORANE	0	180	0	0	0	0	0	LITERS	
DICHLORSILANE	C1,C2,C6	G	S20,S21	U1	D2	A,D,E	4 CYLINDER	DICHLORSILANE	0	0	0	0	10	60	60	LBS	
ETHYLENE	C2		S20,S21		D4		5 LB	ETHYLENE	0	4.5	2	0	0	0	0	LBS	
ETHYLENE GLYCOL		L	S2		D2		1 CASE	ETHYLENE GLYCOL	0	0	0	0	30	0	0	GALLONS	
ETHYLENE GLYCOL		L	S13		D2		-	ETHYLENE GLYCOL	0	0	80	0	0	6	0	LITERS	
FLUORINE	C1,C6		S21	U3	D2		1 LB	FLUORINE	0	0	0	1	0	0	0	LBS	
FLUORINE/ARGON MIXTURE	C1,C6	G	S21	U3	D2		2 CYLINDER	FLUORINE/ARGON MIXTURE	0	0	0	0	0	83	0	LBS	
FORMULA BT-S		L	S10				1 CASE	FORMULA BT-S	0	0	0	0	0	8	8	GALLONS	
FREON 14	C8	L	S4	U1	D2		1 BOTTLE	FREON 14	0	2	0	0	0	0	0	LBS	
FREON 23	C8	L	S4	U1	D2		1 BOTTLE	FREON 23	0	3	0	0	0	0	0	LBS	
FREON TF	C8	L	S2	U3	D4		20 GAL	FREON TF	0	60	300	0	60	120	240	lbs	ELLIS ST RARELY USED, MOST PROBABLE TRANSFER TO FERG
HALOCARBON 116(HEXAFLUOROETHANE)	C8	G	S20	U1	D2		20 LB	HALOCARBON 116(HEXAFLUORO	0	0	0	0	0	0	20	0	LBS
HALOCARBON 14(TETRAFLUOROMETHANE)	C6	G	S20	U1	D2	A,B,D	1 KGM	HALOCARBON 14(TETRAFLUORO	0	0	0	0	0	0	1	1	KILOGRAMS
HELIUM	C8	G	S20,S21	U1	D2		10 CYLINDER	HELIUM	0	5584	4983	1440	1726	873	2032	CU FT	
HEXANE AR	C2		S2		D4		500 mL	HEXANE AR	0	500	0	0	0	0	0	MILLILITERS	
HYDRO CHLORIC ACID	C4	L	S2,S3	U2,U4	D1,D2	A,B	1 CASE	HYDRO CHLORIC ACID	36	36	0	0	0	40	0	LBS	
HYDRO FLUORIC ACID	C4	L	S1,S2,S3,S24	U2,U4	D1,D2	A,B,E	2 CASE	HYDRO FLUORIC ACID	160	120	304	240	640	1000	440	LBS	
HYDROGEN	C2	G	S20,S21	U2,U4	D1,D2	A,B,E	5 CYLINDER	HYDROGEN	524	1050	7601	5481	4769	10764	14877	CU FT	
HYDROGEN CHLORIDE	C1,C6	G	S21	U2,U3	D1,D2		1 CYLINDER	HYDROGEN CHLORIDE	0	130	0	0	0	0	0	LBS	
HYDROGEN FLUORIDE	C1,C6	G	S4,S21	U1,U2,U3	D1,D2		1 CYLINDER	HYDROGEN FLUORIDE	0	3	0	5	10	5	0	LBS	
HYDROGEN PEROXIDE	C3	L	S1,S2,S3,S24	U2	D1	A,B,E	1CASE	HYDROGEN PEROXIDE	4	37	56	24	64	64	44	GALLONS	
HYDROGEN PEROXIDE	C3	L	S1,S2,S3,S24	U2	D1	A,B,E	100 LB	HYDROGEN PEROXIDE	96	270	0	0	0	0	0	LBS	
HYDROGEN/ARGON MIXTURE	C2	G	S20	U1	D2		2 CYLINDER	HYDROGEN/ARGON MIXTURE	0	291	873	0	0	0	0	CU FT	
ISOBUTYLENE	C2		S21				1 CASE	ISOBUTYLENE	0	16	0	0	0	0	0	CU FT	
ISOBUTYLENE	C2		S20				-	ISOBUTYLENE	0	0	12	0	0	0	0	LBS	
ISOPROPANOL	C2	L	S1	U3	D2,D3,D4		1 CASE	ISOPROPANOL	0	0	0	0	0	0	4	GALLONS	
ISOPROPYL ALCOHOL	C2	L	S1,S2,S3,S24	U3	D2,D3,D4	B,E	1 CASE	ISOPROPYL ALCOHOL	64	20	8	4	16	20	12	GALLONS	

GENUS CORP, ELLIS STREET FACILITY-CHEMICAL,GAS HAZARDOUS MATERIAL SUMMARY

ATTACHMENT A-1 (OCTOBER 14,1988)

GENUS CORP, ELLIS STREET FACILITY-CHEMICAL,GAS HAZARDOUS MATERIAL SUMMARY

ATTACHMENT A-1 (OCTOBER 14,19

GENUS CORP, ELLIS STREET FACILITY-CHEMICAL,GAS HAZARDOUS MATERIAL SUMMARY

GENUS CORP, ELLIS STREET FACILITY-CHEMICAL,GAS HAZA

CHEMICAL NAME/ COMMON NAME	CHAR. CODE	STATE CODE	SUPPLIER(S) CODE	USE CODE	DISPO CODE	WHERE	EST. MAX ONSITE QTY	CHEMICAL NAME/ COMMON NAME	ANNUAL PURCHAS QUANTITY 1982	1983	1984	1985	1986	1987	YTD-1988	MEASURE
							0									
KRYPTON	C8	G	S20	U1	D2		1 CYLINDER	KRYPTON	0	0	0	0	0	25	0	LITERS
METHANOL	C2	L	S2,S7	U2,U3			1 CASE	METHANOL	0	4	8	0	0	0	0	GALLONS
METHYL ALCOHOL	C2	L	S2,S8,S26	U3	D2,D3,D4	B,E	1 CASE	METHYL ALCOHOL	0	12	0	0	0	0	0	GALLONS
METHYLENE CHLORIDE		L	S2,S8				1 CASE	METHYLENE CHLORIDE	0	21	0	0	0	0	0	LITERS
MICROPOSIT 1350J PHOTO RESIST			S11	U5	D4		1 CASE	MICROPOSIT 1350J PHOTO RESI	0	1	1	0	0	0	0	QUARTS
MICROPOSIT DEVELOPER			S11	U5	D4		1 CASE	MICROPOSIT DEVELOPER	0	8	5	0	0	0	0	GALLONS
MICROPOSIT PRIMER (SDLV)			S11	U5	D4		1 CASE	MICROPOSIT PRIMER (SDLV)	0	0	3	0	0	0	0	QUARTS
MOLYBDENUM FLUORIDE			S17	U1	D2		1 CYLINDER	MOLYBDENUM FLUORIDE	0	3.1	0	0	0	0	0	KILOGRAMS
NITRIC ACID	C3,C4	L	S1,S2,S3,S7,S24	U1,U2,U3	D1,D2	B,E	1CASE	NITRIC ACID	202	745	280	112	140	322	168	LBS
NITRIC ACID	C3,C4	L	S14	U1,U2,U3	D1,D2	B,E	-	NITRIC ACID	0	4	0	0	0	0	0	GALLONS
NITROGEN	C8	G	S20,S21	U1	D2,D3		10 CYLINDER	NITROGEN	602	4816	12033	6704	672	13680	18816	CU FT
NITROGEN DIOXIDE	C3	G	S20	U1	D2		1 CYLINDER	NITROGEN DIOXIDE	0	18	0	0	0	0	0	LBS
NITROGEN TRIFLUORIDE	C6	G	S21	U1	D2	A,C,E	5 CYLINDER	NITROGEN TRIFLUORIDE	15	178	194	126	68	211	34	LBS
NITROGEN TRIOXIDE	C3,C6	G	S20 OR S21	U1	D2		1 CYLINDER	NITROGEN TRIOXIDE	0	0	1	0	0	0	0	LBS
NITROGEN-LIQUID	C8	L	S21	U1	D2,D3	A-F	1 LN TANK	NITROGEN-LIQUID	0	1541775	8127889	10968195	10933622	15101943	6958941	STD CU FT
NITROGEN-LIQUID	C8	L	S20	U1	D2,D3	A-F	2 CYLINDER	NITROGEN-LIQUID	39	193	1	0	0	0	0	*LT CYLDR
NITROUS OXIDE	C6	G	S21	U1	D2		1 CYLINDER	NITROUS OXIDE	0	0	0	116	0	0	0	LBS
OCTRON TF			S3				60 LB	OCTRON TF	60	0	0	0	0	0	0	LBS
OXYGEN	C2,C3	G	S20,S21	U1	D2	A,B	3 CYLINDER	OXYGEN	4950	4656	9407	9597	3370	5122	6740	CU FT
OXYGEN/ARGON MIXTURE	C3	G	S20	U1,U3	D2		1 CYLINDER	OXYGEN/ARGON MIXTURE	0	0	83	0	0	0	0	CU FT
OXYGEN/HELIUM MIXTURE (5%O)	C3	G	S20	U1,U3	D2		1 CYLINDER	OXYGEN/HELIUM MIXTURE (5%(	0	78	0	0	0	0	0	CU FT
PENTANE REAGENT	C2	L	S2,S8		D4		1 PINT	PENTANE REAGENT	0	1	0	0	0	0	0	PINT
PHOSPHINE/HELIUM MIXTURE	C2,C6	G	S21	U1	D2		1 CYLINDER	PHOSPHINE/HELIUM MIXTURE	78	0	0	0	0	0	0	CU FT
PHOSPORIC ACID	C1,C6	L	S2,S3	U2,U3	D1		1 CASE	PHOSPORIC ACID	56	0	0	0	0	0	0	LBS
POST PLASMA CLEAN			S12				1 CASE	POST PLASMA CLEAN	0	0	0	0	0	1	0	GALLONS
POTASSIUM FERRICYANIDE		S	S2,S7				1 BOTTLE	POTASSIUM FERRICYANIDE	0	1	0.4	0	0	0	0	LBS
POTASSIUM HYDROXIDE	C5	S	S7	U2,U4	D1		1 LB	POTASSIUM HYDROXIDE	0	1	0	0	0	0	0	LBS
POTASSIUM PHOSPHATE	C3	S	S7				2 LB	POTASSIUM PHOSPHATE	0	2	0	0	0	0	0	LBS
PROPYLENE	C2	G	S20				13 LB	PROPYLENE	0	0	13	0	0	0	0	LBS
PRS-1000 (BAKER)		L	S8	U2,U5	D1		1 CASE	PRS-1000 (BAKER)	0	0	0	0	0	32	0	LITERS
RT 2 (CHROMIC ACID)	C1,C6	L	S3,S23	U2	D1		36 LB	RT 2 (CHROMIC ACID)	36	0	0	0	0	0	0	LBS
SILANE	C2,C6	G	S20,S21	U1	D2	A-F	10 CYLINDER	SILANE	11	69	117	85	80	64	80	KILOGRAMS
SILANE/HELIUM MIXTURE	C2,C6	G	S20	U1	D2		2 CYLINDER	SILANE/HELIUM MIXTURE	0	73	0	0	0	0	0	CU FT
SILANE/NITROGEN MIXTURE	C2,C6	G	S20	U1	D2		2 CYLINDER	SILANE/NITROGEN MIXTURE	0	228	0	0	0	0	0	CU FT
SODIUM DICHROMAT	C3	S	S7 OR S26				1 LB	SODIUM DICHROMAT	0	1	0	0	0	0	0	LBS
SODIUM HYDROXIDE	C1	L	S1,S2,S15,S26	U4	D1	A	2000 LB	SODIUM HYDROXIDE	1400	3500	9100	17975	19917	10149	9686	LBS
SULFUR HEXAFLUORIDE	C3	G	S21	U3	D2		6 LB	SULFUR HEXAFLUORIDE	0	0	0	0	5	0	0	LBS
SULFURIC ACID	C4	L	S1,S2,S3,S15,S23	U2,U3	D1,D2	A,B,E	200 LB	SULFURIC ACID	330	1020	1998	262	1746	3626	1442	LBS
TANTALUM CHLORIDE	C1	S	S18	U1	D2		2 KGM	TANTALUM CHLORIDE	0	2	0	0	0	0	0	KILOGRAMS
TETRA FLUOROMETHANE	C2	G	S21	U3	D2		1 CYLINDER	TETRA FLUOROMETHANE	0	0	0	35	0	0	0	CU FT
TITANIUM CHLORIDE	C1		S16	U1	D2		3 L	TITANIUM CHLORIDE	0	3	0	0	0	0	0	LITERS
TITANIUM CHLORIDE	C1		S19	U1	D2		3 KGM	TITANIUM CHLORIDE	0	2.7	0	0	0	0	0	KILOGRAMS
TRICHLORDETHANE	C2	L	S1,S2,S7,S24	U3	D2,D3,D4		-	TRICHLORDETHANE	1	4	24	0	4	0	4	GALLONS
TRICHLORDETHANE	C2	L	S3	U3	D2,D3,D4		1 CASE	TRICHLORDETHANE	96	100	0	0	0	0	0	LBS
TRICHLORDETHANE (1,1,1)	C2	L	S4	U3	D2,D3,D4	A,B,M	-	TRICHLORDETHANE (1,1,1)	8	32	0	0	0	0	0	GALLONS

ATTACHMENT A-1 (OCTOBER 14,1988)

ATTACHMENT A-1 (OCTOBER 14,

GENUS CORP, ELLIS STREET FACILITY-CHEMICAL,GAS HAZARDOUS MATERIAL SUMMARY

CHEMICAL NAME/ COMMON NAME	CHAR. CODE	STATE CODE	SUPPLIER(S) CODE	USE CODE	DISPO CODE	WHERE
TRIETHYLALUMINUM TRIMETHYLAMINE	C2		S16	U1		
TUNGSTEN HEXAFLUORIDE	C1,C6	G	S22	U1	D2	A-F
XENON	C8	G	S20	U1	D2	
OTHER-ENGINEERING LABS						
777 ETCH		L	S12			
ALUMINUM BROMIDE		G	S22	U1	D2,INV	B,D
ALUMINUM TRIFLOURO ACETYLACETONATE		G	S22	U1	D2,INV	B,D
CARBON TETRACHLORIDE		L	S25			B,D
CARBON TETRAFLOURIDE/OXYGEN		G	S20			B,D
CHROMIUM TRIOXIDE		S	S8			B,D
COPPER TRIFLOURACETYL ACETONATEIN BENZENE		G	S22	U1	D2,INV	B,D
MOLYBDENUM HEXAFLUORIDE		G	S22	U1	D2,INV	B,D
MOLYBDENUM PENTAFLUORIDE		S	S16	U1	D2,INV	B,D
NITROGEN TRIFLOURIDE IN 5% ARGON		G	?	U1	D2,INV	B,D
PAD ETCH		L	S12			B,D
PHOSPHORUS FERROCYNIDE		S	S26	U1	D2,INV	B,D
PHOSPHORUS PHOSPHATE		S	S26	U1	D2,INV	B,D
POWER STRIPPER		L	S27			B,D
PRE W ETCH		L	S12			B,D
TANTALUM HEXAFLOURIDE		S	S16	U1	D2,INV	B,D
TANTALUM PENTACHLORIDE		S	S16,S18	U1	D2,INV	B,D
TITANIUM TETRACHLORIDE		G	S21	U1	D2,INV	B,D
TRI CHLOROETHYLENE		L	S2			B,D
TRI-ISOBUTYL ALUMINUM		G	S22	U1	D2,INV	B,D
TUNGSTEN HEXACHLORIDE		S	S16	U1	D2,INV	B,D
UNKNOWN IN 3% BENZENE		G	S22	U1	D2,INV	B,D
OTHER-FACILITIES/JANITORIAL						
BORAXO						K
CLEAN II (PETROLEUM DISTILLATES		L				K
CORRISION INHIBITOR			S10			L
DRAIN CLEANER						L
FLOOR CLEANER		L				K
FLUX,ACID		S				N
HYDROCARBON VACUUM PUMP OIL						L
LAUSTIC FLOOR STRIPPER		L				K
PAINTS		L	VARIOUS			L
RUG CLEANER						K
TOILET CLEANER (H3P04)		L				K
WINDOW CLEANER		L				K

EST. MAX ONSITE QTY	CHEMICAL NAME/ COMMON NAME	ANNUAL PURCHAS QUANTITY 1982	1983	1984	1985	1986	1987	YTD-1988	MEASURE	
200 GM	TRIETHYLALUMINUM TRIMETHY	0	200	0	0	0	0	0	GRAMS	
10 CYLINDER	TUNGSTEN HEXAFLUORIDE	0	200	107	54	127	285	119	KILOGRAMS	
1 CYLINDER	XENON	0	0	0	0	0	25	0	LITERS	
	777 ETCH									INV = 2 gallons-Records not complete as to when,total qty
1 CYLINDER	ALUMINUM BROMIDE			X						INV = 1 LB-Records not complete. Believe 1 cylinder in '84
1 CYLINDER	ALUMINUM TRIFLOURO ACETYLACETONATE			X						INV = 1 LB-Records not complete. Believe 1 cylinder in '84
	CARBON TETRACHLORIDE									INV = 500 Gm-Records not complete as to when,total qty
	CARBON TETRAFLOURIDE/OXYGEN									INV = 3D1-Records not complete as to when,total qty
	CHROMIUM TRIOXIDE									INV = 2.5 Kgm-Records not complete as to when,total qty
1 CYLINDER	COPPER TRIFLOURACETYL ACETONATEIN BENZENE			X						INV = 1 LB-Records not complete. Believe 1 cylinder in'84
1 CYLINDER	MOLYBDENUM HEXAFLUORIDE		X							INV = 1 D-Records not complete. Believe 1 cylinder in '83
1 CYLINDER	MOLYBDENUM PENTAFLUORIDE		X							INV = 300 Gm-Records not complete. Believe 1 cylinder in '83
1 CYLINDER	NITROGEN TRIFLOURIDE IN 5% ARGON									INV = 1 D1-Records not complete as to when,total qty
	PAD ETCH									INV = 2 gallons-Records not complete as to when,total qty
1 CONTAINER	PHOSPHORUS FERROCYNIDE									INV = 300 Gm-Records not complete as to when,total qty
1 CONTAINER	PHOSPHORUS PHOSPHATE									INV = 1.5 Kgm-Records not complete as to when,total qty
	POWER STRIPPER									INV = 2 QTS-Records not complete as to when,total qty
	PRE W ETCH									INV = 7 gallons-Records not complete as to when,total qty
1 CYLINDER	TANTALUM HEXAFLOURIDE		X							INV = 300 Gm-Records not complete. Believe 1 cylinder in '83
1 CYLINDER	TANTALUM PENTACHLORIDE		X							INV = 1.1 Kgm-Records not complete. Believe 1 cylinder in '83
1 CYLINDER	TITANIUM TETRACHLORIDE		X							INV = 1 LB-Records not complete.Believe 1 cylinder in '83
	TRI CHLOROETHYLENE									INV = 1.5 QT-Records not complete as to when,total qty
1 CYLINDER	TRI-ISOBUTYL ALUMINUM			X	X					INV = 146 GRAMS-Records not complete. Believe <6 cylinders 84-8
1 CYLINDER	TUNGSTEN HEXACHLORIDE		X							INV = 500 Gm-Records not complete.Believe 1 cylinder in '83
1 CYLINDER	UNKNOWN IN 3% BENZENE				X					INV = 1 LB-Records not complete.Believe 1 cylinder in '85
	BORAXO									INV = 30 lbs-Records not complete as to when,total qty
	CLEAN II (PETROLEUM DISTILLATES									INV = 2 gallon-Records not complete as to when,total qty
	CORRISION INHIBITOR									INV = 4 GALLON-Records not complete as to when,total qty
	DRAIN CLEANER									INV = 1 GALLON-Records not complete as to when,total qty
	FLOOR CLEANER									INV = 2 gallon-Records not complete as to when,total qty
	FLUX,ACID									INV = VERY SMALL-Records not complete as to when,total qty
	HYDROCARBON VACUUM PUMP OIL									INV = 1 GALLON-Records not complete as to when,total qty
	LAUSTIC FLOOR STRIPPER									INV = 5 gallon-Records not complete as to when,total qty
	PAINTS									Records not complete as to when,total qty
	RUG CLEANER									INV = 2 gallon-Records not complete as to when,total qty
	TOILET CLEANER (H3P04)									INV = 5 quart-Records not complete as to when,total qty
	WINDOW CLEANER									INV = 1 gallon-Records not complete as to when,total qty

GENUS CORP, ELLIS STREET FACILITY-CHEMICAL,GAS HAZARDOUS MATERIAL SUMMARY

ATTACHMENT A-1 (OCTOBER 14,1988)

GENUS CORP, ELLIS STREET FACILITY-CHEMICAL,GAS HAZARDOU

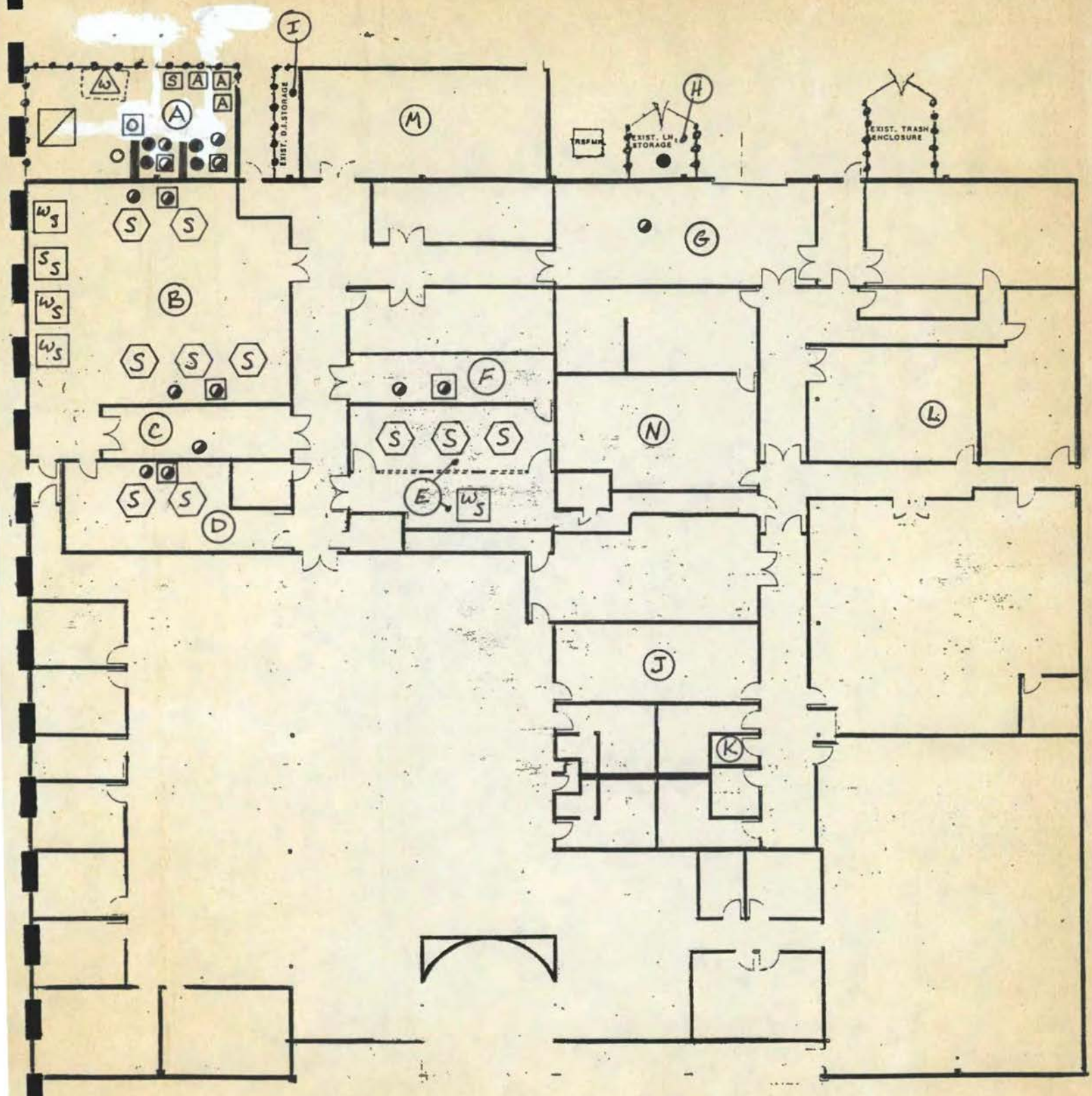
ATTACHMENT A-1 (OCTOBER 14,1988)

LIST OF GENUS (ELLIS ST.) CHEMICAL GAS SUPPLIERS- 1982 TO SEPTEMBER 30,1988

DE	COMPANY		
	SUPPLIERS		
01	GREAT WESTERN	945 AMES AVENUE	MILPITAS,CA 95035
02	YAN WATERS & ROGERS	P.O. BOX 44308	SAN FRANCISCO,CA 94144
S03	ORANGE/GALLADE	1230 E.ST. GERTRUDE PLACE	SANTA ANA,CA 92707
S04	MATHESON	6775 CENTRAL AVE	NEWARK,CA
05	AESAR-JOHNSON/JOHNSON MATTHEY	MATTEY EAGLES LANDING	SEABROOK,NH
S06	EM SCIENCES	480 DEMOCRAT RD	GIBBSTOWN,NJ 08027
S07	AMERICAN SCIENTIFIC/BAXTER	P.O.BOX 6000	SAN FRANCISCO,CA
08	JT BAKER	995 ZETHYR	HAYWARD,CA
S09	SUMNER TAYLOR	967 STOCKTON	SAN JOSE,CA
S10	WATER TECH CHEMICAL	224 N. 27TH ST.	SAN JOSE,CA
11	SHIPLEY	3080 RAYMOND	SANTA CLARA,CA
12	IMAGE TECHNOLOGY	821 SAN ANTONIO	PALO ALTO,CA
S13	FISHER SCIENTIFIC	2170 MARTIN	SANTA CLARA,CA
14	SCIENCE SHOP	P.O. BOX 5884	SAN JOSE,CA
15	PRESSURE YESSEL	50 CHEMICAL WAY	REDWOOD CITY,CA
S16	ALFA PRODUCTS/YENTRON THIOKAL	P.O. BOX 299	DANYERS,MA
17	OZARK-MAHONING	1870 S. BOULDER	TULSA,OK
18	NOAH CHEM	87 GAZZA BLVD	FARMINGDALE,NY
S19	APACHE CHEMICAL	P.O. BOX 126	SEWARD,ILL
20	ALMAC CRYOGENIC/LINDE	1171 OCEAN	OAKLAND,CA
21	AIR PRODUCTS	P.O. BOX 44372, DEPT P	SAN FRANCISCO,CA
S22	AIRCO/GENUS MSD	1970 DIAMOND ST	SAN MARCOS,CA
23	ALLIED		MORRISTOWN,NJ
24	GENERAL CHEMICAL		PITTSBURG,CA
S25	KODAK CHEM		ROCHESTEWR,NY
26	MALLINCKRODT		PARIS,KY
27	PPM TECHNOLOGY		EASTON,PA
S28	CYANTEL CHEM		MOUNTAIN VIEW,CA
	WASTE DISPOSAL		
W01	SOLVENT SERVICES	1021 BERRYESSA	SAN JOSE,CA
W02	ZERO WASTE SYSTEMS	2928 POPLAR	OAKLAND,CA
W03	CSR-CALIF SOLVENT RECYCLE	P.O. BOX 50728	PALO ALTO,CA

ATTACHMENT B

AREAS FOR STORAGE AND USE OF CHEMICALS AND GASES



ATTACHMENT C-1

ATTACHMENT C-2
STORAGE & USE CODE DESCRIPTIONS

Bulk Storage

[A] Acid storage cabinet, double containment-storage of virgin acids waiting use.

[S] Sovlent storage cabinet, double containment-storage of virgin solvents waiting use.

[O] Oxidizer storage cabinet, double containment-storage of virgin material waiting use.

Waste material storage waiting pick-up. Separate 55 gallon approved drums are use for solvent liquids and hazardeous solid wastes. Drums are stored within a double containment zone on the pad. Disposed of by an approved hauler.

Gas cylinder storage (capped & strapped)-material waiting use.

0 Empty gas cylinders waiting pick-up (capped & strapped).

In-process/Useage Storage

[WS] Wet sink (acid) with cart storage (double containment) underneath for working supplies.Drains to the acid neutralization system. Hood over sink is exhausted to the scrubber.

[SS] Wet sink (solvents). Sink empties into 5 gallon container underneath until transferred to the 55 gallon drum for disposal. Hood over sink is exhausted to the scrubber.

Inert gas (helium, argon ,etc) cylinders in use. Connected to equipment. Strapped to supports.

[ ] Hazardous gas cylinders in use. Connected to equipment and enclosed within a gas box exhausted to the scrubber.

⟨S⟩ CVD (chemical vapor deposition) equipment. Various gases are reacted within the system and exhausted to the scrubber system where the vapors are scrubbed/cleaned before venting to the exterior atmosphere. Prior to entering the scrubber, gases first go through a "burn box" to burn-off any residual flammable materials. Scrubber water is drained to and processed by the acid neutralization system before being released (ph-controlled) into the city sewer system.

⧄ Acid neutralization system. Receives highly diluted acids in DI or city water from the acid sinks and scrubber system. Liquid is mixed with sodium hydroxide and sulfuric acid as required to adjust the ph to specification limits, and then released to the city sewer system.

Area Codes/descriptions

Ⓐ Chemical/Gas stortage pad. Fenced in and locked area ouside the building. Pad area has a roof covering. Area contains the acid neutralization system (double containment); bulk storage cabinets with double containment for acids, solvents, and oxidizers; separately walled off areas for storage of gas cylinders for flammable gases and oxidizing gases (capped & strapped); empty gas cylinders waiting pick-up by suppliers; in-process gas cylinders connected to gas line distribution network to the equipment in areas C-F; and storage of 55 gallon drums of solvent and solid wastes waiting pick-up by approved haulers (Drums double contained within sealed burmed area).

Ⓑ TDE Laboratory. An R&D lab used by engineers to develop Genus equipment products. Area contains CVD reactors (5) and acid and solvent sinks used to clean wafers and parts as needed for R&D effort.

Ⓒ Equipment chase area for labs B and D. Contains vacuum pumps and gas cylinders and cooling water distribution lines connected to CVD reactors.

Ⓓ TDE Laboratory. Same as lab B . Does not contain acid or solvent sinks.

(E) Applications Laboratory. Lab used to demonstrate Genus' CVD equipment to its customers. Area is a class 100 clean room. Systems deposit Genus thin films on wafers; however, Genus does not manufacture semiconductors. Lab contains three CVD systems and an acid sink used to clean wafers prior to deposition. Only chemicals being used are stored in the area.

(F) Equipment chase for lab E. Similiar function/use as chase C.

(G) Shipping/Receiving area which also contains a welding station with storage of in-process welding gases.

(H) Liquid Nitrogen tank used to supply nitrogen gas in the building.

(I) Deionized (D.I.) water system which supplies DI water within the building-principly areas B and E.

(J) Document room containing document storage and blue line copy machines.

(K) Janitorial closet used to store janitorial equipment and supplies.

(L) Facilities office use also to stores facilities maintenance supplies, tools, etc.

(M) Model shop containing machine shop tools & equipoment.

(N) Electronics Laboratory. Engineering & prototype electronic equipment is built and tested in this lab.

GENUS

DATE: October 3, 1988

TO: Ron Dornseif

FROM: Norm Zetterquist

SUBJECT: PROCEDURE FOR HANDLING OF HAZARDOUS MATERIALS AT GENUS (ELLIS STREET FACILITIES)

PURPOSE:

1. To guarantee the safety of GENUS employees when in contact with hazardous materials.

2. To enhance employee awareness to the hazards of materials used within the company.

3. To specify the storage, handling, and disposal of hazardous materials within GENUS by specifically trained employees.

OVERVIEW:

Hazardous materials are ordered by GENUS in the classifications of:

1) Corrosive
2) Flammable
3) Oxidizer
4) Acid
5) Alkaline

for use in the processing laboratories (technical development (T/D) and Applications) to "clean" silicon wafers, system parts, and other equipment related to GENUS systems and within the GENUS systems to produce thin films of tungsten and tungsten silicides on silicon wafers.

CORPORATE

Genus Incorporated
515 Ellis Street
Mountain View, CA 94043
TEL 415-960-1120
FAX 415-961-0614 TLX 17-1498

PROCEDURES FOR RECEIVING HAZARDOUS MATERIALS:

1. Liquid chemicals are packaged in either cardboard boxes or "plastic" boxes and are delivered by the chemical companies at the back pad. Immediately upon delivery they are placed within the fenced area of the pad.

2. Gas chemicals are delivered as follows:

   a. All but tungsten hexafluoride (WF_6) are delivered by the gas supply companies at the pad site and are immediately placed within the fenced area of the pad in the "full cylinder" section or bay. They are held in place by a common chain to prevent tipping.

   b. The tungsten hexafluoride is delivered in a special DOT approved package and is received from a common carrier at the receiving dock. The packages are then placed in a special locked storage room for safe keeping. Keys to that room of storage have limited distribution (facilities manager and vice presidents).

3. Solid special order chemicals (i.e., potassium hydroxide (KOH)) are delivered in DOT approved packaging and are shipped by common carrier. When received they are placed in a cabinet within the fenced area of the pad.

PROCEDURE FOR STORAGE OF HAZARDOUS MATERIALS:

1. The bulk of the hazardous liquid chemicals are stored within the fenced area of the pad and only a small amount (less than one week's supply) of chemicals are stored within the two process laboratories for immediate use.

   The chemicals are stored in special lockers which are separated into corrosives, acids, oxidizers, and others. Solvents are separated from other types of chemicals (i.e., acid, oxidizers, and alkalines) within the laboratories to prevent accidental mixing.

2. Gases which are reactive, corrosive, or otherwise hazardous are always stored within the fenced pad area. Certain inert (non-reactive) gases (i.e., argon, nitrogen, or helium) are stored while in use within the process laboratories and process laboratory chases, securely fastened by a strap to either a support or the wall.

   The tungsten hexafluoride packages are stored on special racks in their original packing from shipment in the locked storage area within building.

3. All solid materials are stored within the fenced pad area and are only brought out for use when actually needed. When employees are through using the solid chemicals, they are replaced in their storage place within the fenced pad area. The solid chemicals have a special chemical locker located within the fenced pad area.

4. Janitorial supplies, of which some are considered hazardous, are stored in the locked room within the building. There is limited access to this room. The janitors are the only employees who use these supplies; therefore, they are received through the facilities manager.

PROCEDURE FOR USAGE OF HAZARDOUS MATERIALS:

1. Liquids

   a. Solvents (T/D Lab only)
   Solvents are used within a specially built hood, used for solvents only, and are drained into a special holding tank under this hood. Parts are normally brought to the sink to be cleaned. In some cases, isopropyl alcohol is brought to the systems in plastic bottles to be used to wipe down the chamber on the GENUS system. Paper towels are used as the wiping material. In all cases, gloves and glasses are used when utilizing solvents.

   b. Acids and Alkalines (Both Process Laboratories)
   GENUS has specifically designed chemical hoods for acids, oxidizers, and alkaline chemicals. (Acids and alkaline chemicals are always kept separate.) Alkaline chemicals are presently only being used in the T/D Lab on a limited basis to reclaim test wafers which have been used to deposit tungsten thin films. We have a dedicated sink in which to do this work.

   The chemical sinks are set up so that small amounts (1-4 gallons) of chemicals are poured into containers built into the sink. When the chemicals are ready to be removed, they are drained by using the aspirator to drain the chemicals into the plenum which in turn drains to the house neutralizer system.

   c. Gases
   All reactive, corrosive, or toxic gases except tungsten hexafluoride (WF_6) are used at the pad site. Each gas is hooked up to a gas panel which has the ability to purge and/or vent into the house scrubber either through the GENUS systems or directly to the scrubber. The procedure is controlled to only be done by properly trained personnel.

   Tungsten hexafluoride cylinders are taken from the store room, uncrated, and brought into the T/D laboratory or Applications chase area. Specific procedures are followed (which are well documented) to purge, change, and repurge the lines to prevent contamination of the system and the outside world.

   d. Solid Chemicals
   When solid chemicals are used in the laboratories, they are opened, mixed, used, and closed within a chemical hood (this is rarely done). The solid waste materials we have are generated by use of our systems to deposit tungsten film (more on this later).

PROCEDURES FOR TRANSPORTATION OF HAZARDOUS MATERIALS (from storage to use point to storage)

1. Liquids
   All liquid materials are contained in one to two gallon-type containers and are transported by use of "rubber" buckets to the laboratory storage slots. After use they are rinsed with water in the case of acids, alkaline, or oxidizers. In the case of solvents, they are not cleaned but are capped and removed.

   Liquid waste solvents are transported from the solvent sink holding tank to a 55 gallon drum for storage until it is picked up by the hazardous material handler.

2. Gases
   After they are used, the cylinders are transported by cart to the empty cylinder location and are chained to prevent tipping.

3. Solid Waste
   All solid waste is bagged and sealed. The bags are then transported to the fenced pad area where the bags are placed in a 55 gallon drum. The drums are separated by solid or liquid.

TYPES OF POTENTIALLY HAZARDOUS MATERIALS <u>GENERATED</u> BY GENUS:

In the operation of the GENUS systems, there are chemical gaseous reactions to deposit tungsten films. These reactions are:

1. $WF_6 + SiH_4 + Ar \rightarrow WSix + SiF_x + HF$
2. $WF_6 + SiH_4 + H_2 + Ar \rightarrow W + SiF_x + HF + H_2$
3. $WF_6 + Si_2Cl_2 + Ar \rightarrow WSix + SiFx + HF$

The volatile reaction products (SiFx, HF and H_2) are passed through a vacuum pumping system consisting of a root blower and a vane pump. The vane pump is lubricated with a prefluoropolyether fluid which both prevents chemical reaction in the pump and acts as a trapping medium for the excess tungsten, SiH_4, SiFx, and HF. This fluid is filtered through two specially designed chemical filters to prolong the life of the fluid. At filter change time, these filters are treated as hazardous waste and are bagged up and placed in the solid waste drum.

The old fluid is reused after filtering. Eventually, if the prefluoropolyether is disposed of, it is transported to the liquid 55 gallon drum. We have had the pump fluid (prefluoropolyether) analyzed by Dupont to look for hazardous materials. No hydrofluoric acid was found in the sample and other residues were silicon dioxide and tungsten.

Other potentially hazardous materials may also be encountered in the hardware of the systems (i.e., gas lines, etc.). Any hardware which is disposed of is done so by placing it in the 55 gallon hazardous solid waste drum.

The last source of potentially hazardous waste is in the vent lines from each system to the scrubber. These lines are periodically cleaned out and residue from these lines is bagged and placed in the solid waste, 55 gallon drum. This waste is usually gathered on the roof and personnel wear full protection, including respirators.

HAZARDOUS WASTE STORAGE AT GENUS

As previously mentioned, all potentially hazardous liquid waste is either handled by the neutralizer, in the case of aqueous waste or in the case of solvents by catching it and transferring it to the liquid waste 55 gallon drum.

The neutralizer system handles both the scrubber water (which washes down the fumes carried away from the GENUS systems chemical hoods and gas cabinets) and the water, with chemicals when dumped, from the chemical sinks. This waste water is transported through lines to the fenced pad where the neutralizer is located.

The neutralizer makes sure that the fluids are neutralized to a pH of 6-10 and are then discharged through the storm drain. The neutralizer system holds the liquid within a holding tank until it is within the correct pH range. It alarms when it is out of range.

I have recently completed a chemical analysis of our treated waste water from the neutralizer and the results of these tests indicate levels below the limit. I was especially testing for fluoride ion because it is our main by-product.

NEUTRALIZATION SYSTEM

INPUTS

1. Roof Scrubber - steady 5 gpm, 24 hours/day

2. Three wet sinks in TDE Lab, one wet sink in Applications Lab.

    - Applications Lab usage is much greater than TDE Lab usage.

    - Used periodically during 8 hr, 5 day/week.

    - When operated, Cascade DI water turned on with EST flow approximately three gpm (gallons per minute) maximum during period of use (5-15 minute maximum/event).

    - Rinse water with low level acid.

    - Drain goes to pump/holding tank.
        - TDE tank approximately 20 gallons capacity.
        - Applications tank approximately 40-50 gallons capacity.

    - Pumps turn on automatically to lift water (with dilute acid) to roof to tie into scrubber line to neutralizer system (in the case of the applications lab) or lift approximately five to eight feet to top of neutralization holding tank (in the case of the TDE lab).

    - When acid bath is changed (less than once per day) the acid tank is drained into a cascading water drain, next into a holding tank, and finally pumped to the next system. Acid concentration of dilute acid is higher than acid concentration of rinse water with low level acid.

3. Neutralization System Rated at 15 gpm

    - Scrubber 5 gpm steady (24 hours/day, 7 days/week).

    - Wet sinks

        - Peak Load
          20-25 gpm/wet sink for period of less than 5 minutes (125 gallons/dump maximum).

- Average after hours is approximately zero.
- Average during working hours is less than 0.6 gpm.

BATCH NEUTRALIZATION SYSTEM

1.0 INTRODUCTION

1.1 DESCRIPTION AND THEORY OF OPERATION

The Batch Treatment Neutralization System has the capability of processing typical untreated acid waste and producing a treated waste to meet federal and local requirements for pH. The major components of the system are:

a. Tank 1 (lift station) — 5 GALLON
b. Tank 2 (holding tank) — 750 GALLON } DOUBLE CONTAINMENT
c. Tank 3 (reaction tank) — 375 GALLON }
d. Tank 4 (final monitor)
e. Transfer pump
f. Mixer
g. Motorized Ball Valve
h. Caustic and Acid feed pumps
i. Control panel

Acidic waste enters the lift station (tank 1) through a 2" line by gravity flow. Then it transfers to the holding tank (tank 2) by means of transfer sump pumps and level control, in order to equalize the pH and the flow. When a volume of approximately 300 gallons is reached in tank 2, a level sensor activates the system transfer pumps. The acid waste is then pumped to tank 3 in approximately 6 to 8 minutes. When volume of 300 gallons is reached in tank 3 a level sensor stops the transfer pumps.

When the transfer pump stops, the mixer starts and the caustic or acid is injected to adjust pH to the preset level.

When the desired pH level is reached, the motorized ball valve opens to drain the contents of tank 3 to tank 4 for final monitoring. Once the contents are completely drained, a level sensor releases the lock-out of the transfer pump.

The SHANNON ENGINEERING Batch Treatment Neutralization System includes high level alarm in tank 1, 2, and 3. If the incoming flow volume refills the lift station (tank 1) the pump will come on and drain the tank to the holding tank (tank 2). Once the level reaches below the high level alarm the alarm will go off and the condition presets itself.

BATCH NEUTRALIZATION SYSTEM

2.0 SPECIFICATIONS

Systems Capacity:

Tank 1 - 5 Gallons

Tank 2 - 750 Gallons

Tank 3 - 375 Gallons

Maximum flow:

900 gallons per hour of acid waste

Dimensions:

9' 4" x 12' 0" x 5' 10"

Weight:

1,500 lbs

Construction:

Polyethylene tanks and Steel Skid

Required Services:

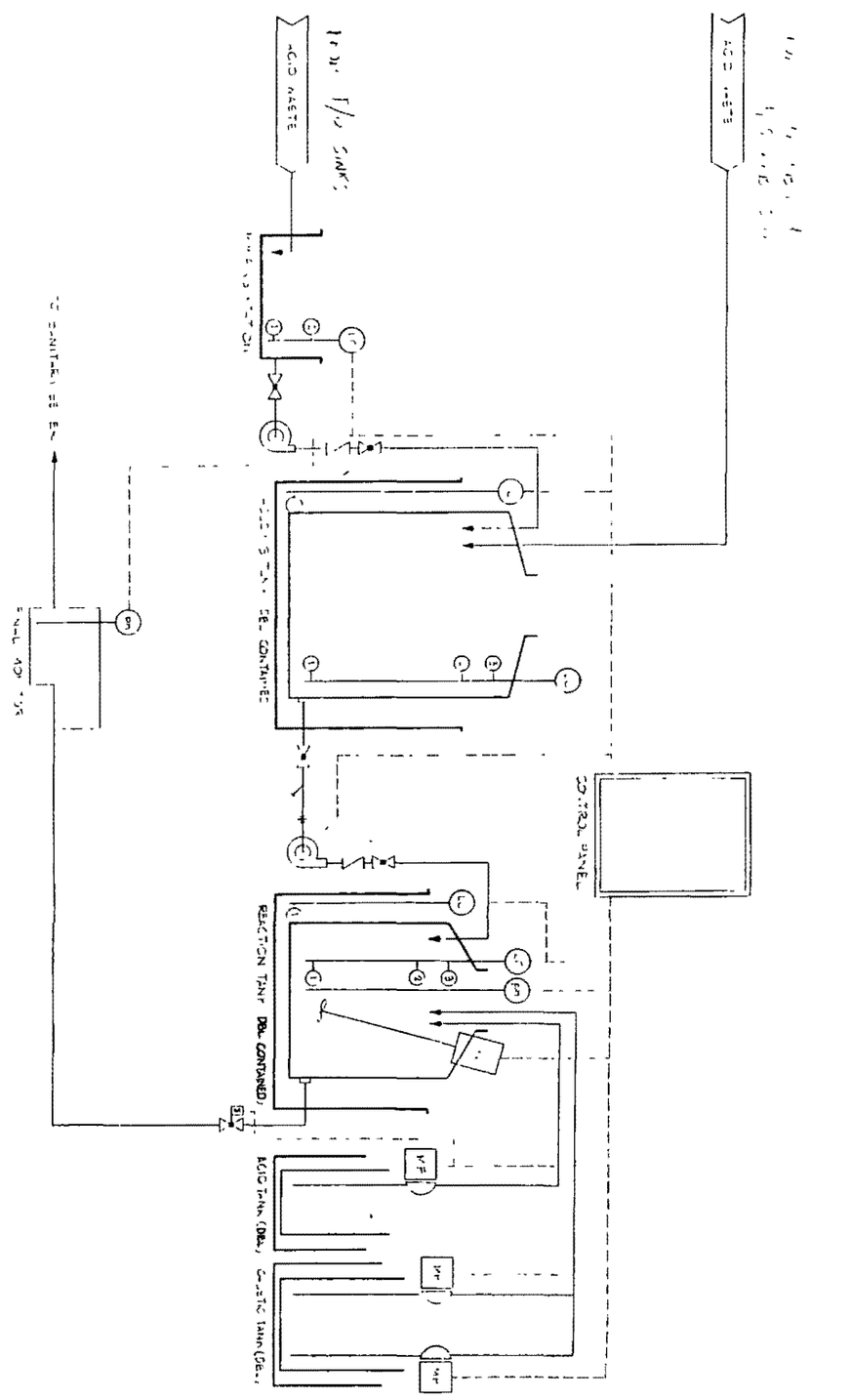
Electrical - 115V, 20amps, 1phase & 230V, 30amps, 1 phase

Drain - 4 inches

Incoming - as needed

Reagents:

30% sodium hydroxide
36% sulfuric acid



REVISION	APPROVED	RINSE WATER NEUTRALIZATION DIAGRAM	GENUS 515 ELLIS ST MTN VIEW, CA 94043	SHANNON ENGINEERING INC 275 NORTH MATHILDA AVE SUNNYVALE, CALIF 94086 TEL (408) 730 1365
		SCALE: NONE	pH ADJUSTMENT SYSTEM	

JOB NO.
DRAWN BY
DATE
SHEET NO.

Air Products

GENUS
March 1983

STORAGE AND SUPPLY SYSTEMS

I. INDUSTRIAL GAS SUPPLY

A. General System Operation. The proposed equipment is designed to provide gaseous nitrogen to Genus with vaporization capacity to cover all peak flow demands. The gases are stored as cryogenic liquids. The nitrogen will be vaporized by using ambient air as a source of energy and on demand will be withdrawn as a controlled pressure. The equipment is shipped as modular assemblies to facilitate trouble free installation. The product is delivered via 6000 gallon cryogenic tankers and pumped into storage through self-contained pumps on the tanker.

B. Specific Equipment Description

1. Liquid Storage Tank LIN

In light of the monthly consumptions, Air Products recommends installation of either a Model CLC 4700 Liquid Nitrogen tank. This vessel will store a net capacity of 4700 gallons or a gaseous equivalent of 437,617 SCF in nitrogen service. The tank has an aluminum inner vessel and a carbon steel outer vessel. The annular space is insulated with high vacuum and perlite. The control piping and valving are installed at our manufacturing complex to minimize field installation. The vessel is constructed so that it can be filled from the top and bottom alternately or simultaneously without discontinuing customer service. The top and bottom fill allows the fill operator to maintain a constant pressure during transfill.

A pressure build up circuit is provided which vaporizes liquid from the storage tank and returns this vapor to the top of the vessel to maintain pressure at the level required for transferring liquid to the house-line or house-line vaporizer.

An economizer circuit also included, conserves gas by relieving excess tank pressure into the liquid line to the house-line vaporizer. The flow schematic for this vessel following details this operation.

Each tank is supplied with a pressure gauge, a liquid level gauge and vacuum readout connection. The pressure and liquid level gauges are sufficient for normal monitoring of the tank condition.

Air Products

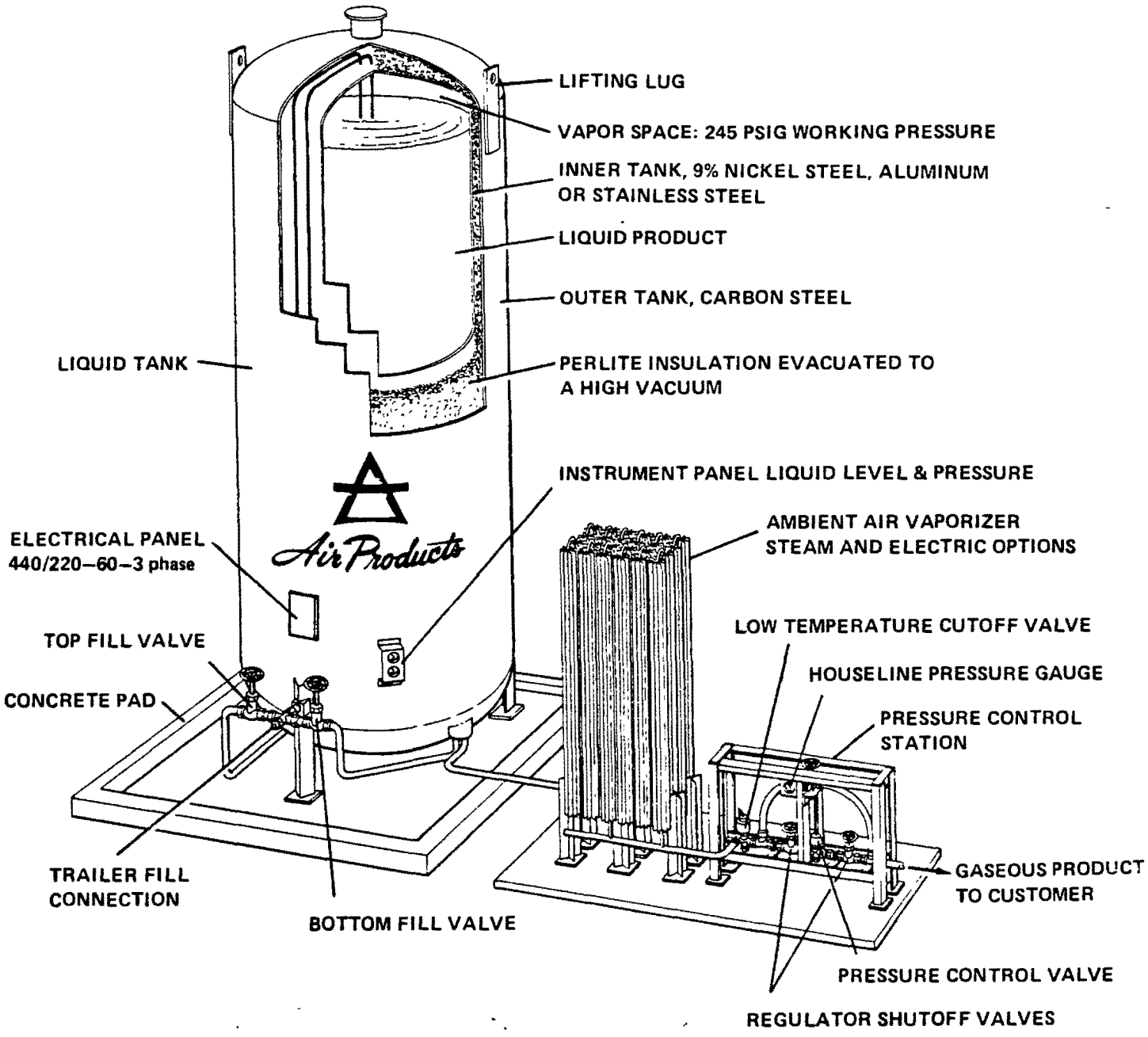
Safety considerations of the vessel are satisfied by a full flow safety valve and an emergency backup rupture disc directly associated with the inner vessel. Vessel piping is protected with thermal relief valves. The outer vessel is protected with a lift plate.

a. Vaporization - For the normal 100 psig gas requirements, Air Products will install two star-finned aluminum vaporizers. These star-finned vaporizers are trouble free units having a flow capacity rating of 3000 SCFH each under normal climatic conditions (70°F, calm, no sunlight). The vaporizers are piped in parallel to minimize pressure drop, which for flows expected, will almost be negligible. The modular unit concept allows system design flexibility and more efficient operation due to greater air ventilation between the units.

b. Pressure and Temperature Control Assembly - A pressure control station will be provided. It is sized to control pressure with flows to 25,000 SCFH very adequately. The assembly contains a self-contained pressure regulator and temperature control valve. The function of the pressure control valve is to reduce the vessel storage pressure to the house line required pressure. A bypass valve is also provided for manual pressure reduction in case the regulator should fail. The function of the temperature control valve is to throttle or shut off nitrogen flow in the event of vaporizer overwithdrawal. (With the vaporization capacity proposed - 12,000 SCFH - this possibility is quite remote). This extra safety precaution, however, will prevent brittle fracture of the carbon steel house-line due to extremely low temperatures should flows ever exceed the vaporizer capacity.

C. High Purity Delivery System

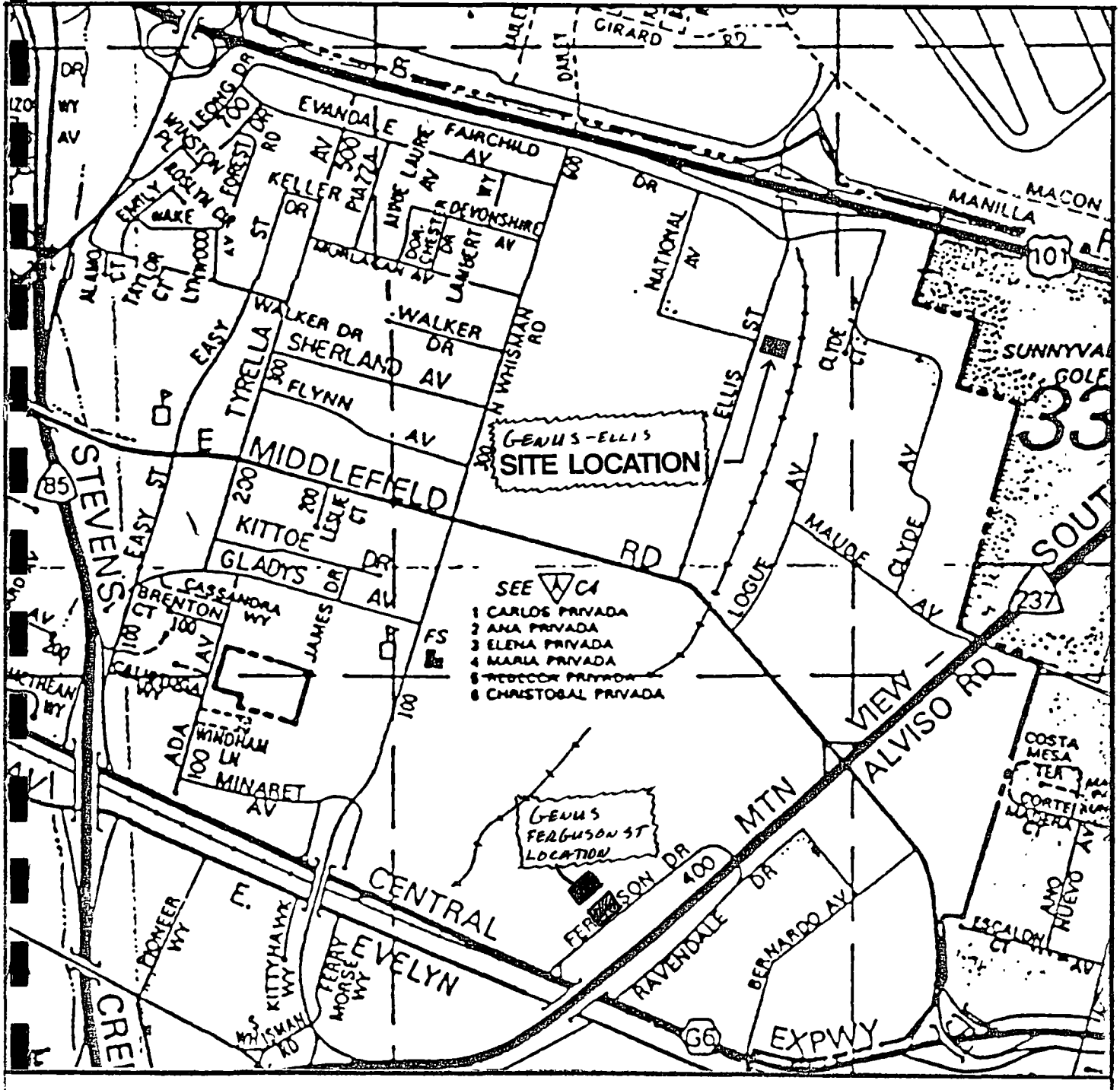
The systems described above are cleaned and welded to meet our High-Purity semiconductor standards. If your requirements dictate a higher grade of piping and/or cleaning, Air Products is able to provide this service. These modifications include, but are not limited to, 100% stainless steel piping, dual filling systems and on-site purification systems. Cost will be provided upon request.



TYPICAL LIQUID TANK INSTALLATION

Air Products

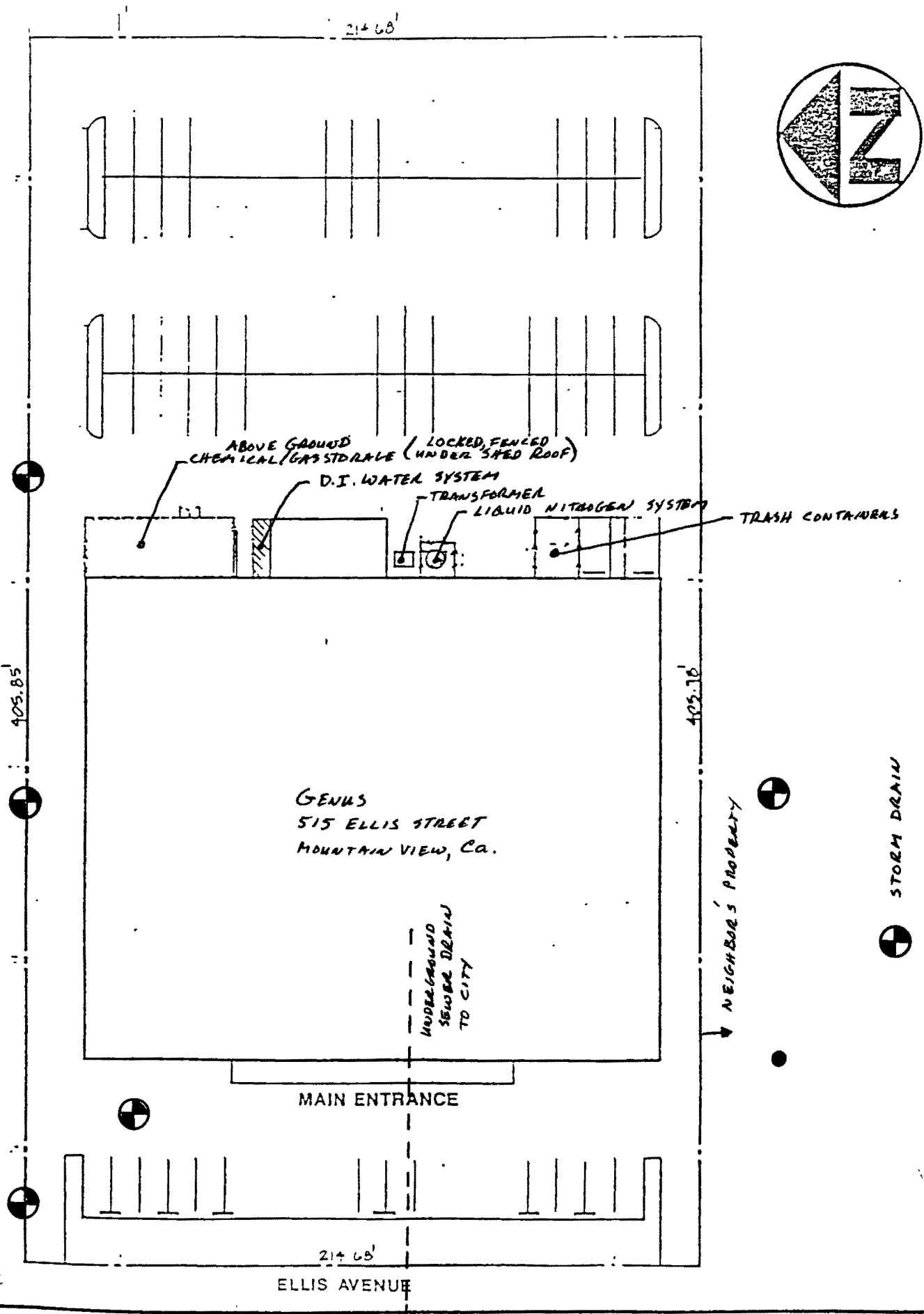
SITE LOCATION



SITE LOCATION

ATTACHMENT F-1

SITE PLAN



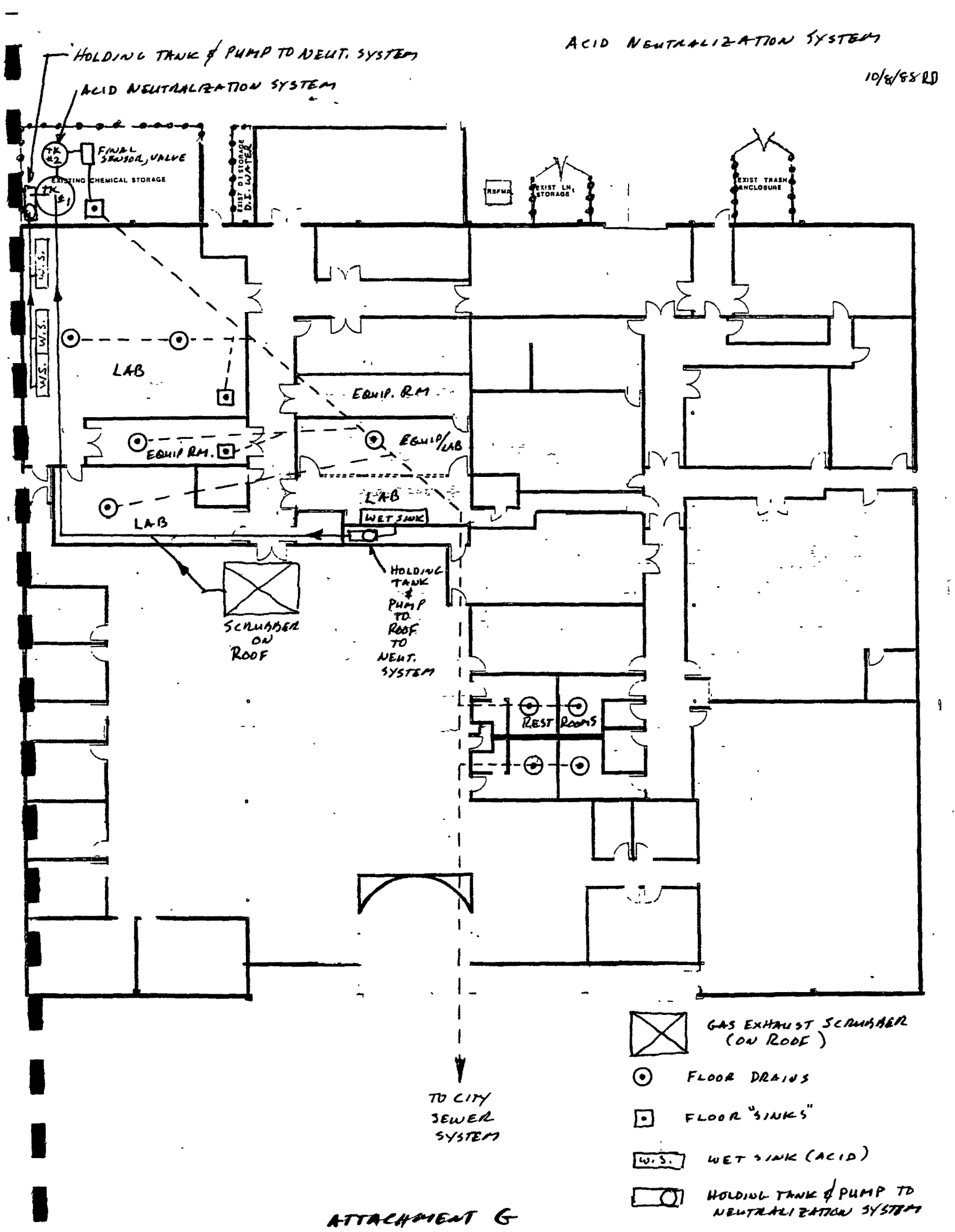
ATTACHMENT F-2 10/3/88 RD

HOLDING TANK & PUMP TO NEUT. SYSTEM

ACID NEUTRALIZATION SYSTEM

ACID NEUTRALIZATION SYSTEM

10/8/88 RD



ATTACHMENT G

2/12/88

Ralph Itanen:

We need to have Shannon Engineering, as part of their waste water treatment function, analyze our waste water coming out of the neutralization tank to the sewer.

Please contact them, arrange for sampling and get the results of the sampling.

I am mainly looking for Fluoride ions. I probably should talk with someone there at Shannon to see what else (elements) we should include in the analysis.

Norm Z.

SEQUOIA Analytical Laboratory
2549 Middlefield Road
Redwood City, CA 94063 • (415) 364-9222

Solvent Service, Inc.
1040 Commercial St., Suite 101
San Jose, CA 95112
Attn: Sue Vedantham

Date Sampled: 01/27/88
Date Received: 02/01/88
Date Extracted: 02/08/88
Date Reported: 03/29/88

Project: Genus, 515 Ellis St., Mountain View

Sample Number	Sample Description
8020095	Powder

PRIORITY POLLUTANTS
BASE/NEUTRAL EXTRACT ORGANICS
results in ppb

Acenaphthene	< 200	Diethylphthalate	< 200
Acenaphthylene	< 200	Dimethylphthalate	< 200
Anthracene	< 200	Di-n-octylphthalate	< 200
Benzo (a) anthracene	< 200	Dibutylphthalate	< 200
Benzo (b) fluoranthene	< 200	Isophorone	< 200
Benzo (k) fluoranthene	< 200	Benzidine	<1,000
Benzo (a) pyrene	< 200	2,4-Dinitrotoluene	< 200
Benzo (g,h,i) perylene	< 200	2,6-Dinitrotoluene	< 200
Chrysene	< 200	1,2-Diphenylhydrazine	< 200
Dibenzo (a,h) anthracene	< 200	Nitrobenzene	< 200
Fluoranthene	< 200	N-Nitrosodimethylamine	< 200
Fluorene	< 200	N-Nitrosodi-n-propylamine	< 200
Indeno (1,2,3-c,d) pyrene	< 200	N-Nitrosodiphenylamine	< 200
Naphthalene	< 200	2-Chloronaphthalene	< 200
Phenanthrene	< 200	1,3-Dichlorobenzene	< 200
Pyrene	< 200	1,4-Dichlorobenzene	< 200
Bis (2-chloroethyl) ether	< 200	1,2-Dichlorobenzene	< 200
Bis (2-chloroethoxy) methane	< 200	3,3-Dichlorobenzidine	<1,000
Bis (2-ethylhexyl) phthalate	< 200	Hexachlorobenzene	< 200
Bis (2-chloroisopropyl) ether	< 200	Hexachlorobutadiene	< 200
4-Bromophenyl phenyl ether	< 200	Hexachloroethane	< 200
Butyl benzyl phthalate	< 200	Hexachlorocyclopentadiene	< 200
4-Chlorophenyl ether	< 200	1,2,4-Trichlorobenzene	< 200

Method of Analysis: EPA 8270

SEQUOIA ANALYTICAL LABORATORY

Arthur G. Burton
Laboratory Director

SEQUOIA Analytical Laboratory
2549 Middlefield Road
Redwood City, CA 94063 • (415) 364-9222

Solvent Service, Inc.
1040 Commercial St., Suite 101
San Jose, CA 95112
Attn: Sue Vedantham

Date Sampled: 01/27/88
Date Received: 02/01/88
Date Extracted: 02/08/88
Date Reported: 03/29/88

Project: Genus, 515 Ellis St., Mountain View

Sample Number	Sample Description
8020095	Powder

PRIORITY POLLUTANTS

ACID EXTRACT ORGANICS

results in ppb

4-Chloro-3-methylphenol	< 200
2-Chlorophenol	< 200
2,4-Dichlorophenol	< 200
2,4-Dimethylphenol	< 200
2,4-Dinitrophenol	< 1,000
2-Methyl-4,6-dinitrophenol	< 200
2-Nitrophenol	< 200
4-Nitrophenol	< 1,000
Pentachlorophenol	< 200
Phenol	< 200
2,4,6-Trichlorophenol	< 200

Method of Analysis: EPA 8270

SEQUOIA ANALYTICAL LABORATORY

Arthur G. Burton
Laboratory Director

SEQUOIA Analytical Laboratory
2549 Middlefield Road
Redwood City, CA 94063 • (415) 364-9222

Solvent Service, Inc.
1040 Commercial St., Suite 101
San Jose, CA 95112
Attn: Sue Vedantham

Date Sampled: 02/01/88
Date Received: 02/01/88
Date Analyzed: 02/11/88
Date Reported: 03/29/88

Sample Number	Sample Description
8020096	Liquid

PRIORITY POLLUTANTS

PURGEABLE HALOCARBONS

results in %

Bromomethane	< 0.05	1,2-Dichloropropane	< 0.05
Bromodichloromethane	< 0.05	1,3-Dichloropropene	< 0.05
Bromoform	< 0.05	Methylene chloride	< 0.05
Carbon Tetrachloride	< 0.05	1,1,2,2-Tetrachloroethane	< 0.05
Chloroethane	< 0.05	Tetrachloroethene	< 0.05
2-Chloroethylvinyl ether	< 0.05	1,1,1-Trichloroethane	< 0.05
Chloroform	< 0.05	1,1,2-Trichloroethane	< 0.05
Chloromethane	< 0.05	Trichloroethene	1.5
Dibromochloromethane	< 0.05	Vinyl chloride	< 0.05
1,1-Dichloroethane	< 0.05	1,2-Dichlorobenzene	< 0.05
1,2-Dichloroethane	< 0.05	1,3-Dichlorobenzene	< 0.05
1,1-Dichloroethene	< 0.05	1,4-Dichlorobenzene	< 0.05
trans-1,2-Dichloroethene	< 0.05		

Method of Analysis: EPA 601

SEQUOIA ANALYTICAL LABORATORY

Arthur G. Burton
Laboratory Director

SEQUOIA Analytical Laboratory
2549 Middlefield Road
Redwood City, CA 94063 • (415) 364-9222

Solvent Service, Inc.
1040 Commercial St., Suite 101
San Jose, CA 95112
Attn: Sue Vedantham

Date Sampled: 02/01/88
Date Received: 02/01/88
Date Reported: 03/29/88

Project: Genus, 515 Ellis St., Mountain View

Sample Number	Sample Description
8020096	Liquid

ANALYSIS

pH	7.0
Flashpoint, °C	40

SEQUOIA ANALYTICAL LABORATORY

Arthur G. Burton
Laboratory Director

SEQUOIA Analytical Laboratory
2549 Middlefield Road
Redwood City, CA 94063 • (415) 364-9222

Solvent Service, Inc.
1040 Commercial St., Suite 101
San Jose, CA 95112
Attn: Sue Vedantham

Date Sampled: 02/01/88
Date Received: 02/01/88
Date Reported: 03/29/88

Project: Genus, 515 Ellis St., Mountain View

TOTAL OIL AND GREASE

Sample Number	Sample Description	Detection Limit %	Gravimetric Petroleum Oil %
8020094	Machine Oil	0.001	100

Method of Analysis: EPA 3550 with trichlorotrifluoroethane and gravimetric determination.

SEQUOIA ANALYTICAL LABORATORY

Arthur G. Burton
Laboratory Director

SEQUOIA Analytical Laboratory
2549 Middlefield Road
Redwood City, CA 94063 • (415) 364-9222

Solvent Service, Inc.
1040 Commercial St., Suite 101
San Jose, CA 95112
Attn: Sue Vedantham

Date Sampled: 02/01/88
Date Received: 02/01/88
Date Reported: 03/29/88

Project: Genus, 515 Ellis St., Mountain View

Sample Number	Sample Description
8020094	Machine Oil

ANALYSIS

pH	5.0
Flashpoint, °C	210

SEQUOIA ANALYTICAL LABORATORY

Arthur G. Burton
Laboratory Director

SOLVENT SERVICE, INC.

1040 COMMERCIAL STREET, SUITE 101, SAN JOSE, CA 95112
(408) 286-6446

S S I WASTE MATERIAL PROFILE SHEET

SSI#_____

1. GENERAL INFORMATION

Generator Name_____

Facility Address_____

_____

Contact Person_____

Generator USEPA I.D._____

Tax ID # _____

Name of Waste_____

Hazard Class_____ ID #_____ RQ_____

Proper DOT Shipping Name_____

Extra Descriptive Information on Name_____

_____

EPA Waste # _____ State Waste # _____

Process Generating Waste_____

2. PHYSICAL CHARACTERISTICS OF WASTE

Color_____ Odor: _____ None
_____ Mild
_____ Strong

Describe: _____

Physical State at 70F.
_____ Solid _____ Semi-Solid
_____ Liquid _____ Powder

Layers.
_____ Multi-layered
_____ Bi-layered
_____ Single Phased

Free Liquids.
_____ Yes _____ No
Volume_____%

pH.
_____ Less than 2 _____ 7.1 - 10.0
_____ 2 - 4 _____ 10.1 - 12.5
_____ 4.1 - 6.9 _____ 12.5
_____ 7 _____ Exact

Specific Gravity

_____ < 0.8	_____ 1.3 - 1.4
_____ 0.8 - 1.0	_____ 1.5 - 1.7
_____ 1.1 - 1.2	_____ > 1.7

Flash Point

_____ < 70F	_____ > 200F
_____ 70 - 100F	_____ No Flash
_____ 101 - 139F	_____ Exact
_____ 140 - 200F	

3. CHEMICAL COMPOSITION

(Total Percentage should add up to 100%)

_____	_____%	_____	_____%
_____	_____%	_____	_____%
_____	_____%	_____	_____%
_____	_____%	_____	_____%
_____	_____%	_____	_____%

4. METALS

(total in ppm)

Arsenic_____	Selenium_____
Barium_____	Silver_____
Cadmium_____	Copper_____
Chromium_____	Nickel_____
Mercury_____	Zinc_____
Lead_____	Thallium_____
Chromium-Hex_____	

5. OTHER COMPOUNDS

(total in ppm)

Cyanides_____
Sulphides_____
PCB's_____
Phenolics_____

6. ADDITIONAL INFORMATION_____

_____

This is to certify that the information submitted is complete and accurate, and that all known or suspected hazards have been disclosed.

_____	_____
Authorized Signature	Title
_____	_____
Name in Print	Date

Balazs Analytical Laboratory

2284 Old Middlefield Way □ Mountain View, CA 94043 □ (415) 965-0423 □ Telex 262251

Mr. Ralph Itanen
GENUS INC.
515 Ellis Street
Mountain View, CA 94304

January 4, 1987

Dear Ralph,

This is a follow up of our discussion of December 15, 1986 regarding testing of your D.I. water. As you requested I am sending you a cost estimate for monitoring D.I. water. Our cost consists complete analysis of your D.I. water at the post final filter and bacteria analysis at the points of use. The breakdown of the costs are listed in the worksheet attached.

After our meeting, I am sure you understand the significance of a good quality control program for your D.I. water system. It is very important to find and identify problems before they go out of control and cause production shut-downs. Generally the cost ofa Quality Control Program pays for itself, because it will dramatically reduce costs of your D.I. system upkeep.

We would be pleased to continue helping GENUS to achieve best quality D.I. water possible, which will bring a higher production yield. If you have any immediate questions, please contact me at (415) 965-0423 otherwise I will be waiting for your final approval.

Sincerely,

Alex Berlin

Alex Berlin
Technical Sales

1/9/87

Ralph will have done again in Jan.

Review results.

SEMICONDUCTOR PROCESSING QUALITY CONTROL

PURE WATER ANALYSIS WORKSHEET Prepared for GENUS INC.

ANALYSIS	PLAN A (monthly)	PLAN B (bi monthly)	PLAN C
Residue	$ 60.00	$ 60.00	
TOC	$ 60.00	$ 60.00	
Culture Bacteria Counting 3 @ $ 45.00	$ 135.00	$ 135.00	
EPI Counting & Bacteria			
Particle Count Optical	$ 60.00	$ 60.00	
Particle Count Instrumental			
SEM Particle Counting			
Silica	$ 40.00	$ 40.00	
TDS			
Incoming Water Complete			
Resin Analysis Anion or Cation			
Resin: Anion and Cation			
Ion Chromotography	$ 130.00	$ 130.00	
Trace Metals: By AA By ICP By ICP-MS			
Total Analysis Cost	$ 485.00	$ 485.00	
Technician Cost	$ 80.00	$ 80.00	
Total Cost	$ 565.00	$ 565.00	
Annual Cost	$ 6780.00	$ 3390.00	

Balazs Analytical Laboratory

2284 Old Middlefield Way □ Mountain View, CA 94043 □ (415) 965-0423 □ Telex 262251

Mr. Ralph Itaren
GENUS
515 Ellis St.
Mt. View, CA 94043

Sample Date: 3-7-88

Report Date: 3-22-88

W.O. #88-548

P.O. #31918L

QUANTITATIVE DETERMINATION OF TRACE ELEMENTS BY ICP-MS

	No ID
Na	3400 ppm
Mg	0.14 ppm
Ca	2.7 ppm
Ba	0.007 ppm
Sr	0.02 ppm
K	1.9 ppm
W	0.18 ppm
Zn	0.067 ppm
Cr	0.025 ppm
Cu	0.06 ppm
B	0.072 ppm
Ti	0.046 ppm
Al	0.05 ppm
Fe	0.25 ppm

Note: All other elements not detected are not reported. A list of the elements analyzed is enclosed for your reference.

This report, including any attachments, has been reviewed and approved by:

Theresa Chu
Water Lab Supervisor
ref13263

Balazs Analytical Laboratory
2284 Old Middlefield Way □ Mountain View, CA 94043 □ (415) 965-0423 □ Telex 262251

TABLE 1
DETECTION LIMITS OF TRACE ELEMENTS BY ICP-MS

Element		Detection Limit (ppb)	Element		Detection Limit (ppb)
Aluminum	(Al)	0.07	Mercury	(Hg)	0.05
Antimony	(Sb)	0.02	Molybdenum	(Mo)	0.02
Arsenic	(As)	0.2	Neodymium	(Nd)	0.02
Barium	(Ba)	0.01	Nickel	(Ni)	0.02
Beryllium	(Be)	0.04	Niobium	(Nb)	0.02
Bismuth	(Bi)	0.04	Osmium	(Os)	0.02
Boron	(B)	0.1	Palladium	(Pd)	0.06
Cadmium	(Cd)	0.03	Platinum	(Pt)	0.08
Calcium	(Ca)	5	Potassium	(K)	5
Cerium	(Ce)	0.01	Praseodymium	(Pr)	0.01
Cesium	(Cs)	0.02	Rhenium	(Re)	0.06
Chromium	(Cr)	0.03	Rhodium	(Rh)	0.02
Cobalt	(Co)	0.01	Rubidium	(Rb)	0.01
Copper	(Cu)	0.04	Ruthenium	(Ru)	0.05
Dysprosium	(Dy)	0.04	Samarium	(Sm)	0.04
Erbium	(Er)	0.02	Scandium	(Sc)	0.05
Europium	(Eu)	0.02	Selenium	(Se)	7
Gadolinium	(Gd)	0.04	Silicon	(Si)	100
Gallium	(Ga)	0.04	Silver	(Ag)	0.03
Germanium	(Ge)	0.05	Sodium	(Na)	0.06
Gold	(Au)	0.05	Strontium	(Sr)	0.01
Hafnium	(Hf)	0.03	Tantalum	(Ta)	0.02
Holmium	(Ho)	0.01	Tellerium	(Te)	0.04
Indium	(In)	0.02	Thallium	(Tl)	0.05
Iridium	(Ir)	0.06	Titanium	(Ti)	0.05
Iron	(Fe)	7	Tungsten	(W)	0.01
Lanthanum	(La)	0.01	Uranium	(U)	0.02
Lead	(Pb)	0.05	Vanadium	(V)	0.03
Lithium	(Li)	0.03	Ytterbium	(Yb)	0.03
Lutetium	(Lu)	0.01	Yttrium	(Y)	0.02
Magnesium	(Mg)	0.02	Zinc	(Zn)	0.05
Manganese	(Mn)	0.02	Zirconium	(Zi)	0.01

Balazs Analytical Laboratory

2284 Old Middlefield Way □ Mountain View, CA 94043 □ (415) 965-0423

ION CHROMATOGRAPHIC ANALYSIS

COMPANY: GENUS CONTACT: Ralph Itanen DATE SAMPLED: 3-7-88 W.O. #88-548

IONIC CONCENTRATIONS, PPM

	ANIONS							CATIONS			
SITE	F^-	Cl^-	NO_2^-	$HPO_4^=$	Br^-	NO_3^-	$SO_4^=$	Li^+	Na^+	NH_4^+	K^+
NO ID	*	93	*	*	*	*	7540	NA	NA	NA	NA

*Not Detected at ppm level.

ANALYST: _____

APPROVED BY: Theresa Chu
Water Lab Supervisor

Balazs Analytical Laboratory

BAL-LAB

2284 Old Middlefield Way □ Mountain View, CA 94043 □ (415) 965-0423 □ Telex 262251

INVOICE 13368

ACCOUNTS PAYABLE
[illegible]
[illegible] Ellis St.
Mt. View, CA 9[illegible]

Date 3-22-[illegible]

Job No. 88-548

P.O. No. 31918L

DESCRIPTION	QTY	UNIT COST	TOTAL
ICP MS Quantitation	1	350.00	350.00
Ion Chromatography (Anions Only)	1	100.00	100.00

APPROVED FOR PAYMENT

ACCT. 251-7610

TOTAL AMOUNT DUE $450.00

Terms Net 30 days
Past due accounts will be subject to to a late charge of 1½% per month
This is your final invoice No statement will be sent

515 Ellis Street
Mountain View
California 94043
(415) 960-1120

GENUS

PURCHASE REQUISITION

No. ➔ 21785

FOR PURCHASING USE ONLY

PURCHASE ORDER	DATE	PAGE OF
No.		

FOR REQUISITIONERS USE ONLY

P.R DATE	REQUISITIONER	EXT.	DEPT.	DELIVER TO:	INSPECTION REQ'D
2-18-88	RALPH ITANEN	306	1351	✓	☐ YES ☒ NO

SUGGESTED SUPPLIER: BALAZS ANALYTICAL LABORATORY — CERTS REQUIRED ☐ YES ☒ NO

PHONE NO.: ALEX BERLIN 965-0423

NOTES.

NEEDED FOR WASTE WATER TO CITY DRAIN FROM NEUTRAIZING SYSTEM

VENDOR

CONFIRM TO — DATE

SHIP VIA — F.O.B.

TERMS — TAXABLE ☐ YES ☐ NO

SHIP TO — BUYER

ITEM NO.	COMPLETE DESCRIPTION INCLUDING MANUFACTURER'S NAME & NUMBER	JOB NO./ ACCT. NO.	U/M	QTY	DATE REQUIRED	EST. COST / U	EXTENSION	UNIT PRICE	EXTENSION	DELIVERY DATE
1	ANALYSIS WASTE WATER	1351/7610	ea	7	SEE NOTE		150.00			
	FOR IONS									
2	ANALYSIS WASTE WATER	1351/7610	ea	4			180.00			
	FOR METAL DEPOSITS									
	NOTE: SCHEDULE TO TAKE SAMPLE WILL BE									
	SETUP BY RALPH ITANEN									
					ESTIMATED TOTAL ▶		330.00	TOTAL ▶		

BUYER NOTES

APPROVALS

REQUISITIONER	SUPERVISOR	DATE	AUTHORIZED SIGNATURE	DATE